UC SANTA BARBARA

THE Current

March 23, 2001
Gail Gallessich

Old Growth Trees of Amazon May Reduce Atmospheric Carbon More Than Previously Thought

According to this week's Nature Magazine, trees in old-growth tropical forests live longer than previously thought, thus adding to their importance in controlling atmospheric carbon dioxide.

The empirical model used in the study was developed by first author Jeffrey Q. Chambers while he was a graduate student and researcher at the National Center for Ecological Analysis and Synthesis (NCEAS) at the University of California, Santa Barbara in 1998.

Chambers and a group of researchers worked in old-growth forests near Manaus, Brazil, where they discovered that very large trees can be more than a thousand years old, far older than expected. They used radiocarbon dating and long-term observations of forest growth. Chambers' model shows that these older forests would accumulate carbon for more than a century, if increases in atmospheric carbon dioxide promote faster tree growth.

Increased carbon dioxide in the atmosphere is believed to be the main cause of global warming. The Kyoto Protocol calls for reductions in atmospheric carbon dioxide.

But Chambers is quick to point out that "Although preserving forests will play a key role in accomplishing Kyoto protocols, to really accomplish the goals of controlling atmospheric carbon dioxide, we will have to cut back on fossil fuel emissions in the coming decades."

The study shows that the long-term forest capacity for accumulating carbon --which slows global warming -- may be greater than previously thought. However, the actual rate at which these forests absorb carbon dioxide in any given year may much slower.

"The maximum rate for carbon dioxide accumulation per year appears to be about a half to perhaps one ton of atmospheric carbon dioxide for an area of forest the size of a football field," said Chambers. "Because of these slow rates, carbon sequestration in forests is only a partial solution."

These latest findings may have an impact with Kyoto Protocol provisions, said co-author Susan Trumbore of UC Irvine. Under the precepts of the protocol, which has yet to be enacted, each industrialized nation must reduce fossil fuel emission to below 1990 levels through a combination of cutting emissions and offsetting them by increasing carbon "sinks" such as forests. Understanding exactly how long trees in tropical forests can live provides much-needed information on the carbon storage capacity of these forests and emphasizes the importance of maintaining them.

Chambers also notes that in addition to providing carbon sinks, accumulating carbon in their wood for over a century after an increase in biomass productivity, the tropical forests "provide habitat for about half of the world's biodiversity, maintain existing hydrological cycles, and provide chemical precursors for the biomedical industry, not to mention the aesthetic and intrinsic value of a vast natural wilderness."

Besides Chambers and Trumbore, Niro Higuchi and Edgard Tribuzy of the Brazilian National Institute for Amazonian Research participated in the study. Chambers is affiliated with NCEAS at UCSB, Earth Sciences at UC Irvine and the Smithsonian Biological Dynamics of Forest Fragment Project, Manaus, Brazil. The work is part of the Large-scale Biosphere-Atmosphere experiment in the Amazon, a Brazilian-led multinational research effort supported by NASA.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.